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AUTHOR Robbins, Jerry H.
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ABSTRACT

A formula model is presented for use by the chief academic officer, college deans, department chairpersons, and section heads to make the specific dollar allocations to the academic units for which they are responsible. The following calculations and estimations of the factors in the formula are explained: total adjusted amount to be allocated, in dollars; average faculty support at standard amounts; and estimated work load units. Included is a comprehensive example to which the formula model is applied. (BD)

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A MODEL FOR THE ANNUAL ALLOCATION OF FINANCIAL RESOURCES TO ACADEMIC UNITS IN HIGHER EDUCATION

Jerry H. Robbins

Professor of Educational Administration and
Dean of the College of Education

University of Arkansas at Little Rock
33d and University Avenue
Little Rock, Arkansas
72204

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A MODEL FOR THE ANNUAL ALLOCATION OF FINANCIAL RESOURCES TO ACADEMIC UNITS IN HIGHER EDUCATION

Higher education institutions employ a variety of practices in making annual financial allocations to academic units. In many instances, the allocations appear to be based on little more objectivity than "greasing squeaky wheels," or "doing five per cent more (or worse, less) than last year."

Many individual faculty members feel that little objectivity is brought to the allocations to their respective colleges and departments. These faculty members can easily find examples of financial resources allocated in a manner other than that which recognizes the academic unit's size, productivity, status, etc.

One might think that such a frequent process as the allocation of resources would prompt numerous articles. Such is not the case. In numerous instances deans and chairpersons are admonished to be "fair" in their allocations without any real guidance as to how to determine fairness. The various formulas that appear in the literature deal with the macro-economic setting of education--usually the distribution of funds to higher education in a state by a legislature or the allocation of funds among campuses of a system. Only rarely is any mention made of a systematic allocation of funds among units on a campus. Where this does exist, it appears to be applicable

only to very large institutions with an extensive data base in computer memory.* As a result, there is little or nothing to guide the systematic allocation of funds in the great majority of institutions.

Purpose

The purpose of this paper is to present a formula model that may be used by the chief academic officer, college deans, department chairpersons, and section heads to make the specific dollar allocations to the academic units for which they are responsible. The model will be presented such that it can be used at several levels of sophistication, depending on the size and complexity of the academic unit and the data available (or that can be estimated) for use in the model.

Overview

Assumptions.

1. The use of the model assumes that essentially a lump sum allocation is available to the academic unit head, who has the responsibility in many instances for re-allocating the funds to smaller units in the structure. The purpose of the model is to provide an objective approach to this reallocation of funds to the smaller unit.

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*See, for example, the recent work published by the National Center for Higher Education Management Systems (NCHEMS).

2. There is also the assumption that the smaller academic units to which funds are to be allocated differ in size. Although this size can be measured in different ways, it is assumed that the resources should be allocated roughly in proportion to the size of the unit.

3. It is seldom recognized that different academic units have different "mixes" of academic ranks. That is, one such unit may consist primarily of full and associate professors. Another such unit may consist primarily of instructors and assistant professors. It is assumed that faculty salary (and more important, total faculty support) should be roughly proportional to the rank held. As a result, any allocation formula should allow for the fact that academic units with many at the upper ranks will need more faculty support funds than academic units with many at the lower ranks.

4. Supply and demand among disciplines is rarely taken into account in making allocations. However, it is a fact of life, even in a time of relative plenty among available faculty, that supply and demand, tradition, and competition must be recognized in allocations to academic units. Whether it is desirable or not, physicians teaching in medical schools must be allocated more salary and other faculty support than persons at the same rank teaching, say, history. As a result, it is assumed that any rational allocation of resources among academic units must take into account the "going rate" of faculty salary and other support.

Accordingly, the remainder of this paper presents a method by

which academic administrators may allocate financial resources among the academic units for which they are responsible based on (a) the total adjusted amount to be allocated, (b) the estimated work load units to be produced by each unit, and (c) the needed faculty support at "standard" rates.

The Formula

Let

T = the total adjusted amount to be allocated, in dollars.

F = the average faculty support at standard amounts, in dollars.

F_1 , F_2 , F_3 , . . ., F_n represent this quantity for each of academic units 1, 2, 3, . . ., n, respectively.

W = estimated work load units

W_1, W_2, W_3, . . ., W_n represent this quantity for each of academic units 1, 2, 3, . . ., n, respectively.

$$D = (F_1)(W_1) + (F_2)(W_2) + (F_3)(W_3) + \cdots + (F_n)(W_n)$$

The formula then becomes

$$\text{Unit 1's allocation} = \frac{(T)(F_1)(W_1)}{D};$$

$$\text{Unit 2's allocation} = \frac{(T)(F_2)(W_2)}{D};$$

$$\text{Unit 3's allocation} = \frac{(T)(F_3)(W_3)}{D};$$

. . . . . ;

$$\text{Unit n's allocation} = \frac{(T)(F_n)(W_n)}{D};$$

Calculations and Estimations of the Various Factors in the Formula

Total adjusted amount to be allocated, in dollars. The total adjusted amount to be allocated, in dollars, is an amount determined by policy or by the person making the allocation as the total sum of money available to be allocated among the academic units, less sums determined by other means for acquisitions/personnel/programs/special awards not to be included in the formula allocation.

This formula assumes that what is going to be allocated is based essentially on assigned duties of the unit and of the faculty in the unit. If, for example, it is determined by policy that 20% of all available funds are going to be allocated to support and reward faculty research conducted outside of normal assigned duties, and that 20% of all available funds are going to be allocated to support and reward faculty service activities conducted outside of normal assigned duties, then only the remaining 60% of all funds will be allocated through this formula.

Other sums can and should be subtracted before the formula is used. Examples of these are given below:

(As might be used by a vice president for academic affairs)

1. Support of a campus-wide office of research coordination
2. Acquisition of media equipment to be used campus-wide
3. Library acquisitions
4. Start-up costs for a new college being created

(As might be used by a dean of a college)

1. Support for organizational dues, accreditation fees, and other such college-wide costs
2. Costs of operating the dean's office
3. Support for a college-wide coordinator of public service activities
4. Acquisition of a major piece of equipment to be used college-wide

(As might be used by a chairperson of a large department)

1. Start-up costs for a new program
2. Support for a faculty member on leave with pay
3. Payment of honoraria to non-faculty clinical supervisors

The determination of the amounts of money to be subtracted for purposes such as those given above must, of necessity, remain subjective to a large degree. However, an element of objectivity can be introduced by making the decision to fund such items, and the amounts that they are to be funded, a collective decision by the parties affected.

Average Faculty Support at Standard Amounts. Faculty support within the academic areas consists primarily of salary funds. In its simplest form, the formula may be used with just salary data. However, a more accurate use of the formula comes when other faculty support is included in the calculations. This additional faculty

support would include, but not be limited to, the quantity (and quality, as measured by higher pay) of secretarial assistance, office and other supplies, routine equipment acquisitions and repairs, travel funds, and the like. In disciplines which are laboratory-oriented, there will be the expenses of supporting the laboratories for each faculty member's instruction.

1. Average Faculty Support. The average faculty support may be computed (or as will often be the case, estimated) in any one of several ways, depending on the data which are available and the purpose to be accomplished. In any event, these should be calculated by academic rank,* as follows:

For Unit 1:

a. number of full-time equivalent (FTE) distinguished professors times "standard amount" of support for distinguished professors = $_____

b. number of FTE professors times "standard amount" of support for professors = $_____

c. number of FTE associate professors times "standard amount" of support for associate professors = $_____

d. number of FTE assistant professors times "standard amount" of support for assistant professors = $_____

e. number of FTE instructors times "standard amount" of support for instructors = $_____

f. number of FTE lecturers times "standard amount" of support for lecturers = $_____

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*The author is indebted to Ted Reep's unpublished paper, "Determining Number of Faculty and Salary Rates Based on Work Load and Salary Differentials," for this idea. Mr. Reep is in the Budget Office at Georgia State University, Atlanta.

g. number of FTE graduate teaching assistants (or laboratory assistants) times "standard amount" of supports for graduate teaching assistants = $_____

h. Total number of dollars = $_____

i. Total number of FTE faculty = _____

j. Total number of FTE faculty divided by total number of dollars (Average faculty support for Unit 1) = $_____

Similar calculations are performed for each of the n units for which funds are to be allocated.

It is essential that the calculations be based on the full period of the budget (i.e., 12 months), rather than just on the academic year. For example, a professor who carries a full load during both the academic year and the summer term (or quarter) should be counted as 1.25 or 1.30 (or whatever the institution's policy is) FTE. It is also essential that the FTE faculty at each rank be the number or estimate for the year being budgeted for, not the current year.

2. Calculation or estimation of "standard amount" of support

In its most simple, but least accurate, form the "standard amount" of support for, say, professors, might be the average academic year salary for professors in the total institution (or the college, or the department, or the program). For example, the dean of a college, in making allocations to the departments in that college, might use the average (9 or 12 months) salary of all professors in that college as the "standard amount" of support.

A refinement on this notion would be to calculate or estimate, based on academic unit policy or practice, the "standard support" for each academic rank such that this would include a certain number of dollars for each person's share of secretarial salaries, office supplies, travel, laboratory expenses, equipment, and so on.

For example, if it is an academic unit's policy or practice that one secretary should be provided for each four FTE professors, one secretary for each six FTE associate professors, etc., then the cost of secretarial help should be included in the "standard support" at each rank.

As a further example, if it is policy or practice to provide a certain amount of funds for travel to professors, a different sum for associate professors, and so on, this can and should be included in the "standard support" for each rank. On the other hand, if secretarial help, office supplies, travel, equipment, and the like are provided equally, without regard for rank, then a constant amount to support these functions should be added to the average salary used at each rank to calculate the "standard support."

If, for some reason, it is desirable to allocate, say, different amounts of travel funds for those in unit 1 as opposed to those in unit 2, this can be built in the "standard support" for each unit.

As an illustration, suppose that Unit 1 consists of 1.75 FTE professors, with an average salary of $25,000 for nine months; 3 FTE

associate professors, with an average salary of $20,000 for nine months, and 1 FTE assistant professor, with a salary of $15,000 for nine months. Further assume that there is one secretary, at a salary of $8,000, for all of them, and that all of them have equal claim on the secretary's time and the unit's $2337.50 budget for supplies, expenses, and equipment. However, assume that each professor is entitled to $1000 travel and each associate and assistant professor is entitled to $750 travel funds. The standard support for Unit 1 would be calculated as follows:

1.75 FTE professors times ($25,000 + $1391.30 (for secretary) + $406.52 (for supplies, etc.) + $1000 (travel))	= $48,646.18
3.00 FTE associate professors times ($20,000 + $1391.30 (for secretary) + $406.52 (for supplies, etc.) + $750 (travel))	= 67,643.46
1.00 FTE assistant professor times ($15,000 + $1391.30 (for secretary) + $406.52 (for supplies, etc.) + $750 (travel))	= 17,547.82
Total number of dollars	= $133,837.46
Average faculty support ($133,837 divided by 5.75 FTE)	= $23,276.00

A further refinement on this notion would be to use some external data* for salary (or compensation or total support) to reflect state, regional, or national salaries by rank within a given discipline. These data can be incorporated into the calculations to maintain the same ratios at the local level as exist on the larger geographical area, thus dealing with the supply and demand concern.

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*See Reep's paper for a complete discussion of this idea.

To illustrate, suppose that the southeastern averages for salaries in three disciplines are as follows:

Discipline	Professors	Associate Professors	Assistant Professors	Instructors
X	$23,639	$17,247	$13,887	$10,716
Y	24,499	19,712	16,666	11,769
Z	21,271	17,324	14,571	13,247

Comparing each rank of disciplines X and Z with the corresponding rank of discipline Y, it may be seen that the regional salaries bear these ratios:

Discipline	Professors	Associate Professors	Assistant Professors	Instructors
X	.9649	.8749	.8333	.9105
Y	1.0000	1.0000	1.0000	1.0000
Z	.8682	.8789	.8743	1.1256

Use of the regional data as the "standard amount" for faculty salaries will result in the same ratio (even though the dollar amounts might be higher or lower than the regional dollar figures) of salaries in the local unit as exist in the southeastern region for the disciplines involved. Use of this kind of data could make an institution equally as competitive on the regional market for professors of English as for professors of physics, even though the salaries in both fields might be lower than the regional average.

Similarly, an institution that ranks the highest in its state at each academic rank except associate professors could use weightings

of say 1.10 times the state average for professors, 1.17 times the state average for associate professors, 1.12 times the state average for assistant professors, and 1.07 times the state average for instructors as the standard amounts of faculty salary in order to bring the associate professors to the appropriate level in state comparisons.

Although past year or current year salary and other data may be used in computing the "standard amount" of faculty support, it would be even better to use estimated amounts for the year which is being budgeted for.

Estimated work load units. Many institutions use a simplistic measure of faculty work load units, often that teaching 12 semester hours of undergraduate classes constitutes a full work load. If this is the institutional or academic unit policy, or if this is the best available data, one can simply define 12 hours of undergraduate teaching as one work load unit and define 9 hours of graduate teaching as one work load unit and incorporate this into the formula by multiplying the number of FTE faculty times this average of one work load unit.

However, it would be much better to devise a more sophisticated measure of work load units for the academic units. One such way is given below. See Charts 1 and 2.

CHART 1

UNIVERSITY OF ARKANSAS AT LITTLE ROCK
FACULTY WORK LOAD FORM

Name _____ ___-___-____
Social Security Number

_____ _____
Primary Department Secondary Department Fall__ Spring__ Summer__ 19___

Percent Appt. _____ Hours/Week: Worked ____ Instructional Contact ____

SCHEDULE		DISTRIBUTION THIS PERIOD	Work Units	Percent
Course No.	Enrollment			
		Teaching (Totals A+B+C+D)		
		Research (Total E)		
		Public Service (Total F)		
		Administration (Total G)		
		Total	Total	100%

		WORK UNITS
A.	SCHEDULED CLASSROOM INSTRUCTION	
	Undergraduate	
1.	_____ SSCH for students in classes of fewer than 10 students x 0.10	
2.	_____ Course credit hours (10-40 students) x 1.00	
3.	_____ Course credit hours (41-80 students) x 1.25	
4.	_____ Course credit hours (81-120 students) x 1.50	
5.	_____ Course credit hours (121-160 students) x 1.75	
6.	_____ Course credit hours (more than 160 students) x 2.00	
	Graduate	
7.	_____ SSCH for students in classes fewer than 5 students x 0.30	
8.	_____ Course credit hours (5-20 students) x 1.60	
9.	_____ Course credit hours (21-40 students) x 1.75	
10.	_____ Course credit hours (more than 40 students) x 2.00	
	Scheduled classroom instruction subtotal: Items 1 through 10	
B.	SCHEDULED LABORATORY INSTRUCTION	
11.	_____ Clock hours of responsible charge x 0.67 (if fewer than 10 students, multiply above value by number of students x 0.10)	
C.	SCHEDULED INDIVIDUAL INSTRUCTION	
12.	_____ SSCH special problems or special reading courses x 0.10	
13.	_____ SSCH student intern x 0.30	
14.	_____ Contact hours of private music lessons x 0.67	
15.	_____ SSCH for which Chairperson of Master's Committee, active in thesis x 0.167	
16.	_____ SSCH for which member of Master's Committee, active in thesis x 0.10	
17.	_____ Students for whom Supervisor of Student Teaching Practicum, field work x 0.50	
	Individual Instruction subtotal: Items 12 through 17	
	TOTAL INSTRUCTION (Items 1 through 17) TOTAL A+B+C	
D.	STUDENT ADVISING	
18.	_____ Students for whom Chairperson of Master's Committee, non-thesis or oral exams x 0.33 (maximum of 3 work units)	
19.	_____ Assigned advisees x 0.05	
	TOTAL ADVISING (Items 18 and 19) TOTAL D	
	NOTE: Items E, F, and G are to be completed after consultation with Department Chairperson and/or Dean.	
E.	RESEARCH, CREATIVE AND SCHOLARLY WORK	
20.	_____ Hours/week ÷ 3 TOTAL E	
F.	PUBLIC SERVICE	
21.	_____ Hours/week ÷ 3 TOTAL F	
G.	ADMINISTRATION AND OTHER	
22.	Department Chairperson (3 to 6)	
23.	_____ Hours of assigned administrative work or other duties other than Department Chairperson ÷ 3	
	TOTAL ADMINISTRATION (Items 22 and 23) TOTAL G	
	GRAND TOTAL (Sum of A through G) TOTAL H	

_____
Signature of Faculty Member Date

Reviewed and Approved:

_____
Department Chairperson Date

_____
Dean Date

Distribution: White - Department; Yellow - Dean; Pink - Institutional Studies

CHART 2

UNIVERSITY OF ARKANSAS AT LITTLE ROCK
INSTRUCTIONS/DEFINITIONS FOR COMPLETING
THE INDIVIDUAL FACULTY WORK LOAD FORM

NAME: Must have an entry.

SOCIAL SECURITY NUMBER: Must have an entry.

WORK PERIOD: Must have an entry.

PRIMARY DEPARTMENT: Must have an entry. The Department with which the individual is considered to be assigned for administrative purposes. Home department.

SECONDARY DEPARTMENT: May have an entry. A department other than primary to which the individual has official responsibilities; e.g., joint appointment.

PERCENT APPOINTMENT: Must have an entry. Use whole numbers, no decimals or fractions: e.g., use 13 for a 12-1/2% appointment
use 33 for a 33-1/3% appointment

HOURS PER WEEK WORKED: Must have an entry. For full-time persons the minimum entry is 40. Proportion of employment and minimum hours are as follows: 100% = 40 hours per week minimum; 75% = 30 hours per week minimum; 50% = 20 hours per week minimum; 25% = 10 hours per week minimum; 10% = 4 hours per week minimum.

HOURS PER WEEK INSTRUCTIONAL CONTACT: Must have an entry. Scheduled hours only. Scheduled classroom, laboratory, studio hours, etc., should be given full clock-hour weight. To be shown in whole numbers only. Do not use decimals or fractions.

SCHEDULE: Complete as applicable.

DISTRIBUTION THIS PERIOD: Must be provided. Work units as determined by A through G. Percent -- indicate the percent of work units that each category (Teaching, Research, Public Service, Administration) constitutes of the total work units. Report whole percents only -- no decimals or fractions. Round to nearest whole percent. Total must equal 100%.

Parts A through G. Complete on applicable items and totals.

A. SCHEDULED CLASSROOM INSTRUCTION:

Undergraduate:		3 students in a 3 credit hour course	
Item:	1.	9 SSCH for . . . . . x .10	.90
		4 credit hour course with 43 students	
Item:	3.	4 course credit hours. .x 1.25	5.00
Graduate:		3 credit hour course with 25 students	
Item:	9.	3 course credit hours.. x 1.75	5.25

B. SCHEDULED LABORATORY INSTRUCTION: 3 clock hours per week responsible charge

Item:	11.	3 clock hours . . . . . x 0.67	2.01

C. SCHEDULED INDIVIDUAL INSTRUCTION: students enrolled for 12 hours of active thesis

Item:	15.	12 SSCH for . . . . . x .167		2.00
Total instruction (Items 1 through 15)			Total A	15.16

D. STUDENT ADVISING: Complete as applicable.

E. RESEARCH, CREATIVE AND SCHOLARLY WORK: Complete as applicable
Include:
1. Time spent on research and proposals for external research support.
2. Time writing for publication and similar activities.
3. Performances, presentations and concerts, and creative activities in the fine and performing arts.
4. Time spent for presentation of papers at professional meetings and seminars.

F. PUBLIC SERVICE: Applicable public service activities are determined by college/school/department or Library policies as well as the University policy concerning outside employment and normally do not include activities for which the individual receives direct payment from non-university sources.
1. Activities intended to enhance public understanding of the University or activities intended to develop the service function of the University.
2. Consulting and advising service to the public in the faculty member's area of academic or professional competence.

G. ADMINISTRATION AND OTHER: Complete as applicable.

GRAND TOTAL: Must be provided.

Generally, the sum of the individual faculty work load units for each given academic unit (for the total budget year) for the previous year (or an average over several recent years), plus estimates of growth (new faculty, larger classes, more graduate classes, etc.) or less estimates of decline (loss of faculty, smaller classes, etc.) is the easiest way to determine the estimated number of work load units involved.

In some cases, work load units will be generated but supported by funds other than those to be allocated in this process. This would occur, for example, when a faculty member receives a grant or contract for part or all of his/her time to undertake research or a project. This could also occur when a grant is received to start a new program and the faculty salary for certain courses is paid from "soft" money. It is recommended that the work load units be counted in the computations. This has the effect of rewarding the academic unit for obtaining the grant or contract.

A Comprehensive Example

Assume that the College of A has been allocated $1,000,000 for its operation for the next year by the Vice President for Academic Affairs. Step 1 is for the Dean of the College of A to determine what amounts should be set aside, not to be included in the formula allocation. Assume that he determines that it will cost $60,000 to operate the Office of the Dean and that $10,000 is needed for another special purpose (such as to purchase major items of equipment). Suppose also that the College has determined that 10% of the funds

should be allocated through another arrangement to support and reward research activities not regularly assigned and that an additional 10% of the funds should be allocated through yet another arrangement to support and reward service activities not regularly assigned. In this case, the total adjusted amount to be allocated would be $1,000,000 less $60,000 less $10,000 less $100,000 less $100,000, for a total of $730,000 to be allocated through this formula.

In this college the standard amount of support is based on college-wide average faculty salaries plus other support services. Each of the faculty members typically works for one summer term. The average support by rank, including 9 months salary; one summer term salary; each faculty member's share of secretarial help and travel funds; and each faculty member's share of supplies, expense, and equipment has been calculated to be as follows:

Professors:	$32,628
Associate Professors	24,408
Assistant Professors	20,921
Instructor and lower	17,763

However, campus-wide (and state-wide) surveys have shown that those faculty members at the associate professor level tend to be most behind the averages of the external groups. As a result, the "standard amount" of support for associate professors is to be set at $25,000 in order to make the average salary of those at this rank more competitive with campus and state averages.

Department 1 consists of 2.375 FTE professors (including summer school); 2.125 FTE associate professors; 3.375 FTE assistant professors; and 6.75 FTE instructors. Thus the average faculty support for this department consists of (2.375 x 32,628) + (2.125 x 25,000) + (3.375 x 20,921) + (6.75 x 17,763), or $321,125.13. This, divided by the 14.625 FTE faculty members, gives an average faculty support at standard rates of $21,957.

In a similar manner, it is computed that Department 2, which has primarily associate professors, has an average faculty support of $25,373; Department 3 has an average faculty support of $25,523; and Department 4 has an average faculty support of only $21,363 because of the large number of persons at the lower ranks. Departments 2 and 3 have a number of faculty members on "soft" money that are not included in the calculations given above.

The estimated number of work load units to be produced by each of the four departments is based on the current year's data for the complete academic year, plus estimates of growth or decline. The current year's work load units are as follows:

Department 1	418.9
Department 2	297.4
Department 3	505.6
Department 4	150.8

It is estimated that Department 1 will have a 2% decline in work load units for this coming year; Departments 2 and 3 will have

a 5% increase; and Department 4 will have a 10% increase. As a result, the estimated work load units for the coming budget year are as follows:

Department 1	410.5
Department 2	312.3
Department 3	530.9
Department 4	165.9

In the formula, then, the value of "D" is computed to be

$$D = (\$21,957 \times 410.5) + (\$25,373 \times 312.3) + (\$25,523 \times 530.9) + (\$21,363 \times 165.9) = 9,013,348 + 7,923,988 + 13,550,161 + 3,544,121 = \$34,031,618.$$

For each of the departments, T = $730,000.

For Department 1, the average faculty support was $21,957 and the estimated work load units was 410.5. Thus, under the formula, Department 1's allocation would be

$$\frac{(T)\ (F)\ (W)}{(D)}, \text{ which equals } \frac{(730,000)\ (21,957)\ (410.5)}{(34,031,618)}$$

or $193,342.

The allocations for the other departments are calculated similarly. It must be remembered that the College of A had determined that $100,000 would be allocated to support and reward nonassigned research and that another $100,000 would be allocated to support and reward nonassigned service activities. It is assumed that each of the four departments will share to some extent in each of these $100,000 pools of money.

In summary, there has been presented an objective way of allocating funds to academic units such that the available funds are allocated on the basis of the average faculty support by rank, which can be weighted to correct inequities and supply and demand, and on estimated work load units, which are a measure of productivity.